NAME: SOLUTIONS

QUIZ 4 (March 1, 2017)

Statistics for Social Science (201-401-DW)
Instructor: Emilie Richer

Instructions:

- You have **20 minutes** to complete the quiz
- No books, cell phones or other communication devices are permitted
- You must show all of your work in order to be credited with full marks
- Anyone suspected of cheating will be asked to leave
- This test is marked out of **10 marks**

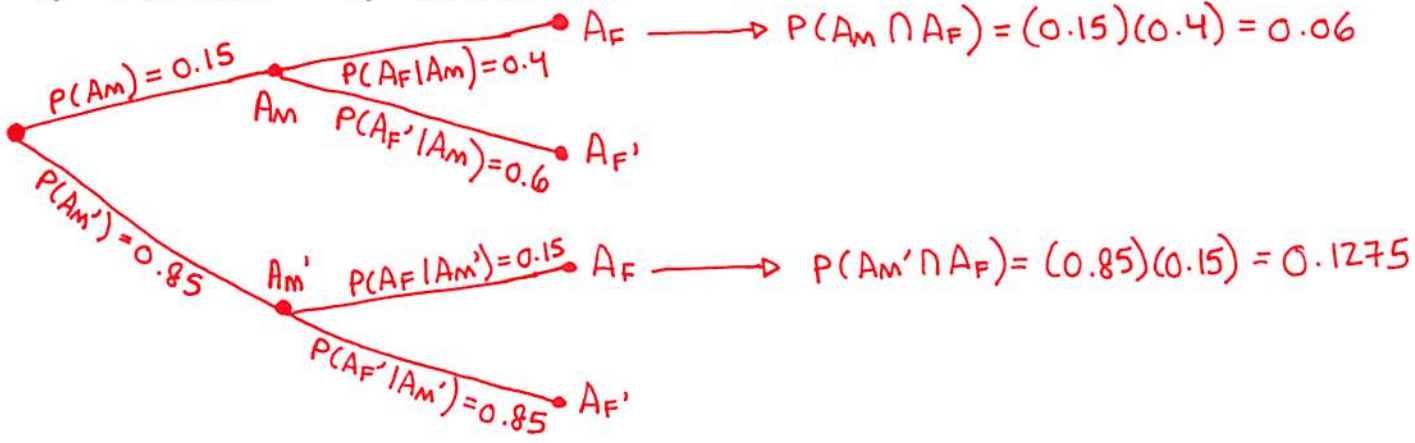
[QUESTION 1] (10 MARKS)

Consider the midterm and final for a statistics class. Suppose 15% of students earned an A on the midterm. Of those students who earned an A on the midterm, 40% received an A on the final. Of those students who learned lower than an A on the midterm, 15% received an A on the final.

You randomly pick a final exam and notice that the student who wrote it earned an A. What is the probability that this student also received an A on the midterm?

Use the following variables when writing out your solution

A_m = A on midterm A_m' = No A on midterm
A_f = A on final A_f' = No A on final



$P(A_M \cap A_F) = (0.15)(0.4) = 0.06$

$P(A_M' \cap A_F) = (0.85)(0.15) = 0.1275$

WE WANT: $P(A_M | A_F)$

$$P(A_M|A_F) = \frac{P(A_M \cap A_F)}{P(A_F)} = \frac{0.06}{0.06 + 0.1275} = \boxed{0.32}$$

} NOTICE HERE WE LIST ALL THE WAYS OF GETTING AN A_F, EITHER $P(A_M \cap A_F)$ OR $P(A_M' \cap A_F)$